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Bibliography

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- (51) [The 7th edition of International Patent Classification]

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- [Patent Attorney]
- [Name] Togawa Intelligent
- [Judge] Uchida Hiroyuki
- (56) [Reference]
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- [References] Provisional publication of a patent Taira 5-235577 (JP, A)
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(58) [The investigated field] (Int.Cl.7, DB name)
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CLAIMS

(57) [Claim(s)]

[Claim 1] In the shielding case attached in said circuit board as is prepared in the case of electronic equipment and covers the electronic parts on the circuit board which has a ground pattern When said shielding case is inserted into the internal surface and said circuit board of said case, Fabricate a sheet plastic and it becomes so that the location contacted to the ground pattern of said circuit board may be equipped with the tongue-shaped piece section. The shielding case characterized by forming the conductive layer for shielding in the location containing the part which contacts said ground pattern in said tongue-shaped piece section among this fabricated sheet plastic by performing electric conduction processing.

[Claim 2] Electronic equipment characterized by providing the following. The circuit board in which it is prepared in the case of electronic equipment, and has a ground pattern, and electronic parts are mounted The shielding case with which the conductive layer for shielding is formed in the location containing the part which fabricates a sheet plastic, becomes so that the location contacted to the ground pattern of said circuit board may be equipped with the tongue-shaped piece section, when inserted into the internal surface and said circuit board of said case, and contacts said ground pattern in said tongue-shaped piece section among this fabricated sheet plastic by performing electric conduction processing

[Claim 3] The shielding case attached in said circuit board as is prepared in the case of electronic equipment characterized by providing the following and covers the electronic parts on the circuit board which has a ground pattern The part which fabricates a sheet plastic, becomes so that it may have the 2nd engagement section which engages with the 1st engagement section prepared in the case of said electronic equipment, while equipping with the tongue-shaped piece section the location contacted to the ground pattern of said circuit board, when said shielding case is inserted into the internal surface and said circuit board of said case, and contacts said ground pattern in said tongue-shaped piece section among this fabricated sheet plastic The part in contact with said ground pattern in said 2nd engagement section

[Claim 4] Electronic equipment characterized by providing the following. The circuit board in which it is prepared in the case of electronic equipment, and has a ground pattern, and electronic parts are mounted The part which fabricates a sheet plastic, becomes so that it may have the 2nd engagement section which engages with the 1st engagement section prepared in the case of

said electronic equipment, while equipping with the tongue-shaped piece section the location contacted to the ground pattern of said circuit board, when inserted into the internal surface and said circuit board of said case, and contacts said ground pattern in said tongue-shaped piece section among this fabricated sheet plastic. The shielding case with which the conductive layer for shielding is formed in the location containing the part in contact with said ground pattern in said 2nd engagement section by performing electric conduction processing.

[Claim 5] In the shielding case attached in said circuit board as it is prepared in the case of electronic equipment and a ground pattern and this ground pattern cover the electronic parts on the circuit board which has the insulated circuit pattern. When said shielding case is inserted into the internal surface and said circuit board of said case, fabricate a sheet plastic and it becomes so that the location contacted to the ground pattern of said circuit board may be equipped with the tongue-shaped piece section. While performing electric conduction processing to the location containing the part which contacts said ground pattern in said tongue-shaped piece section among this fabricated sheet plastic and forming the conductive layer for shielding in it. The shielding case characterized by forming the conductive layer for circuit patterns which is insulated with the conductive layer for this shielding, and is contacted to said circuit pattern.

[Claim 6] Electronic equipment characterized by providing the following. It is the circuit board in which it is prepared in the case of electronic equipment, and a ground pattern and this ground pattern have the insulated circuit pattern, and electronic parts are mounted. Fabricate a sheet plastic and it becomes so that the location contacted to the ground pattern of said circuit board may be equipped with the tongue-shaped piece section, when inserted into the internal surface and said circuit board of said case. While the conductive layer for shielding is formed in the location containing the part which contacts said ground pattern in said tongue-shaped piece section among this fabricated sheet plastic by performing electric conduction processing. The shielding case with which the conductive layer for circuit patterns which is insulated with the conductive layer for this shielding, and is contacted to said circuit pattern is formed.

[Claim 7] Said tongue-shaped piece section is a shielding case given in claims 1 and 3 and either of five which are characterized by being formed in the curved configuration.

[Claim 8] Said tongue-shaped piece section is electronic equipment given in claims 2 and 4 and either of six which are characterized by being formed in the curved configuration.

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DETAILED DESCRIPTION

[Detailed Description of the Invention]

[0001]

[Industrial Application] This invention relates to the electronic equipment which has the suitable shielding case for electronic equipment and these shielding cases, such as portable walkie-talkies, such as a cellular phone and a cordless telephone, and a portable receiver.

[0002]

[Description of the Prior Art] The case of a device consists of cases 10 and 20 of the bottom as

shown in drawing 15, after being formed with plastics, and, besides, the configuration of the outline of the conventional cellular phone has the composition that the circuit board 30 was contained in the lower case 10 and 20. Moreover, by this kind of electronic equipment, the electronic parts 31 carried in the circuit board 30 and the case exterior needed to be covered electromagnetic, and shielding structure as shown in drawing 16 thru/or drawing 18 was used. [0003] The conductive layer 21 formed in the rib 22 which a conductive layer 21 is formed of electric conduction processing of electric conduction paint, plating, vacuum evaporation, etc., and the conductive layer 21 formed in the periphery section of the bottom case 20 at the ground pattern 32 of the circuit board 30 is contacted, or divides the interior of the bottom case 20 into the den for every electrical circuit section is contacted in the internal surface of the bottom case 20. Moreover, as shown in drawing 18 depending on the case, the piece 23 of a metal which has spring nature is attached in the edge of a rib 22, and it is considering as the configuration to which a conductive layer 21 and the ground pattern 32 are connected certainly electrically. On the other hand, the ground pattern 33 is formed also in the rear-face side of the circuit board 30, or a mesh-like ground pattern is prepared in the inner layer of the circuit board 30. Therefore, since electronic parts 31 will be in the condition of having been covered by the ground pattern prepared in the conductive layer 21 prepared in the bottom case 20, and the circuit board 30, internal and external electromagnetic shielding can be performed.

[0004] However, with the shielding structure of performing electric conduction processing to the bottom case 20 as mentioned above, it had the following problems. It is necessary to perform electric conduction processing to the 1st after shaping of the bottom case 20, and it is followed. Since complicated masking needed to be performed so that it might warn against damaging the bottom case 20 used as the appearance of a device, it was necessary to convey the bottom case 20 to electric conduction down stream processing and the bottom case 20 might not be soiled by electric conduction processing. The costs which require many manufacture man days by final completion of the bottom case 20, and start electric conduction processing also became a large sum. Moreover, when there was electric conduction down stream processing with a natural thing, the percent defective of the bottom case 20 was also high.

[0005] Although recycle of a plastic has also been [2nd] an important technical problem in recent years, there is a problem that recycle is difficult, about the bottom case 20 where electric conduction processing is performed.

[0006] Although there are some which cover electronic parts 31 with metal casing 34, and join metal casing 34 to the ground pattern 32 of the circuit board 30 with solder 35 as shielding structure which, on the other hand, does not have the need of performing electric conduction processing in the bottom case 20 as shown in drawing 19 and drawing 20. If it is in this structure, the activity which removes metal casing 34 in the cases, such as repair of electronic parts, becomes very difficult. Since dead space arises between the metal casings 34 and the bottom cases 20 which do not suit portable equipment, such as telephone with which lightweight-ization is demanded since there is weight, metal casing 34 has the problem of moving against the miniaturization of a device.

[0007]

[Problem(s) to be Solved by the Invention] As mentioned above, with the shielding structure constituted by performing electric conduction processing by the case made from plastics, the electric conduction processing costs which require many manufacture man days by final completion of a case also had the trouble that the percent defective of a case became high and that plastics is not recyclable, when there was electric conduction down stream processing which becomes a large sum. Moreover, with the shielding structure using metal casing, the use of metal casing with the difficult attachment-and-detachment activity of metal casing had the trouble of being not suitable in the miniaturization of electronic equipment.

[0008] It aims at offering the shielding structure of electronic equipment where this invention can be made so that it may solve such a conventional fault, electronic parts can be shielded without using metal casing, therefore miniaturization of a device and lightweight-ization can be attained, and it is not necessary to perform electric conduction processing to the case made from plastics itself.

[0009] The shielding case in invention concerning claim 1 In the shielding case attached in said circuit board as is prepared in the case of electronic equipment and covers the electronic parts on the circuit board which has a ground pattern When said shielding case is inserted into the internal surface and said circuit board of said case, Fabricate a sheet plastic and it becomes so that the location contacted to the ground pattern of said circuit board may be equipped with the tongue-shaped piece section. It has the composition that the conductive layer for shielding is formed in the location containing the part which contacts said ground pattern in said tongue-shaped piece section among this fabricated sheet plastic by performing electric conduction processing. When inserted into the circuit board in which the electronic equipment in invention concerning claim 2 is formed in the case of electronic equipment, it has a ground pattern, and electronic parts are mounted, and the internal surface and said circuit board of said case, Fabricate a sheet plastic and it becomes so that the location contacted to the ground pattern of said circuit board may be equipped with the tongue-shaped piece section. It has the composition of providing the shielding case with which the conductive layer for shielding is formed in the location containing the part which contacts said ground pattern in said tongue-shaped piece section among this fabricated sheet plastic by performing electric conduction processing. The shielding case in invention concerning claim 3 In the shielding case attached in said circuit board as is prepared in the case of electronic equipment and covers the electronic parts on the circuit board which has a ground pattern When said shielding case is inserted into the internal surface and said circuit board of said case, while equipping with the tongue-shaped piece section the location contacted to the ground pattern of said circuit board Fabricate a sheet plastic and it becomes so that it may have the 2nd engagement section which engages with the 1st engagement section prepared in the case of said electronic equipment. It has the composition that perform electric conduction processing to the location containing the part which contacts said ground pattern in said tongue-shaped piece section among this fabricated sheet plastic, and the part in contact with said ground pattern in said 2nd engagement section, and the conductive layer for shielding is formed in it. Moreover, the electronic equipment in invention concerning claim 4 When inserted into the circuit board in which it is prepared in the case of electronic equipment, and has a ground pattern, and electronic parts are mounted, and the internal surface and said circuit board of said case, while equipping with the tongue-shaped piece section the location contacted to the ground pattern of said circuit board Fabricate a sheet plastic and it becomes so that it may have the 2nd engagement section which engages with the 1st engagement section prepared in the case of said electronic equipment. The part which contacts said ground pattern in said tongue-shaped piece section among this fabricated sheet plastic, It has the composition of providing the shielding case with which the conductive layer for shielding is formed in the location containing the part in contact with said ground pattern in said 2nd engagement section by performing electric conduction processing.

[0010] The electronic equipment in invention concerning claim 5 is formed in the case of electronic equipment. In the shielding case attached in said circuit board as a ground pattern and this ground pattern cover the electronic parts on the circuit board which has the insulated circuit pattern When said shielding case is inserted into the internal surface and said circuit board of said case, Fabricate a sheet plastic and it becomes so that the location contacted to the ground pattern of said circuit board may be equipped with the tongue-shaped piece section. While performing electric conduction processing to the location containing the part which contacts said ground pattern in said tongue-shaped piece section among this fabricated sheet plastic and forming the conductive layer for shielding in it It is a conductive layer for this shielding with the configuration that the conductive layer for circuit patterns which is insulated and is contacted to said circuit pattern is formed. The circuit board in which the electronic equipment in invention concerning claim 6 is formed in the case of electronic equipment, a ground pattern and this ground pattern have the insulated circuit pattern, and electronic parts are mounted, Fabricate a sheet plastic and it becomes so that the location contacted to the ground pattern of said circuit board may be equipped with the tongue-shaped piece section, when inserted into the internal surface and said circuit board of said case. While the conductive layer for shielding is formed in the location containing the part which contacts said ground

pattern in said tongue-shaped piece section among this fabricated sheet plastic by performing electric conduction processing. It is a conductive layer for this shielding with the configuration of providing the shielding case with which the conductive layer for circuit patterns which is insulated and is contacted to said circuit pattern is formed.

[0011] Since the shielding case is constituted from fabricating a sheet plastic and the tongue-shaped piece section of a shielding case is fabricated in the 1st invention concerning claims 1 and 2 from a sheet plastic so that the location contacted to the ground pattern of the circuit board may be equipped with the tongue-shaped piece section when a shielding case is inserted into the internal surface and the circuit board of a case, the electric contact with a deflection good [the tongue-shaped piece section] is acquired by the press from a case. In the 2nd invention concerning claims 3 and 4, when the 2nd engagement section which engages with the 1st engagement section of a case further is prepared in a shielding case by shaping of a sheet plastic in addition to the above-mentioned configuration and a shielding case is inserted between a case and the circuit board, the 2nd engagement section is pressed by the circuit board and said conductive layer is contacted to a ground pattern.

[0012] By 3rd invention concerning claims 5 and 6, since the conductive layer for circuit patterns insulated with this conductive layer other than the conductive layer for shielding by performing electric conduction processing to the fabricated sheet plastic is formed, in addition to the 1st invention, said conductive layer for patterns can be substituted for the circuit pattern which needs to be prepared in the circuit board, lead wire, and a jumper.

[0013]

[Example] Hereafter, the example of this invention is explained in full detail with reference to drawing 1 thru/or drawing 14. Drawing 1 thru/or drawing 8 are drawings showing the 1st example, and it is drawing where the perspective view of the shielding case with which the perspective view of the shielding case with which the sectional view of the cellular phone of drawing 1 and drawing 3 are used for the round part A enlarged drawing of drawing 2, and drawing 4 is used [drawing 1] for the cellular phone of drawing 1 for the outline block diagram of a cellular phone and drawing 2, and drawing 5 performed the sectional view of the shielding case of drawing 4 to both sides, and drawing 6 performed electric conduction processing, and drawing 7 compared the sectional view of the shielding case of drawing 6, and drawing 8 compared the property of various sheets plastic.

[0014] The outline configuration of the cellular phone of this example consists of shielding cases 140 inserted in the crevice 121 of the bottom case 110 so that it may, the case (case) 110, 120 of the bottom after being formed with plastics, and besides, cover the circuit board 130 contained by the lower case 110, 120 and the electronic parts 131 carried in this circuit board 130, as shown in drawing 1.

[0015] This shielding case 140 is constituted by forming the conductive layer 142 for shielding by performing electric conduction processing to the internal surface of the sheet plastic 141 after shaping, as are shown in drawing 2 and drawing 4, and the thin sheet plastic 141 is fabricated in the configuration which can be inserted in the crevice 121 of the bottom case 120 which was divided into two or more dens with the rib 122, and was made into the complicated configuration and it is shown in it at drawing 5.

[0016] In this case, in this example, it is referred to as 0.15mm - 0.25mm, that weight has also become about 0.6g, and the thickness of a sheet plastic 141 closing in and is markedly more nearly lightweight than the thickness (1mm - 2.5mm) and weight (about 15g) of the bottom case 120 which were formed by the polycarbonate (PC). Therefore, depending on a vacuum forming, a hotpress, and the case, a complicated case configuration can be easily acquired with shaping means, such as injection molding of *****.

[0017] Moreover, as an ingredient of a sheet plastic 141, as shown in drawing 8, polyester (PET), PC, a polyvinyl chloride (PVC), acrylonitrile butadiene styrene (ABS), etc. are usable, but it is thought that PC or ABS is good, considering the viewpoint of thermal resistance or secular change (it hardens especially), and since especially PC is used with the food container etc. and can be manufactured cheaply, it uses PC by this example.

[0018] Moreover, as electric conduction processing to a sheet plastic 141, vacuum evaporation

of metals, such as nickel, Cu, Au, Ag, etc. using technique, such as electroless deposition, such as electric conduction paint, or mixed nickel and the filler of Cu, and nickel, Cu, Au, Ag, or electrolytic plating, sputtering, and ion plating, can be used. In addition, the thickness of the conductive layer 142 prepared in a sheet plastic 141 is 1 micrometer – about 3 micrometers. [0019] Moreover, as a shielding case 140, as shown in drawing 6 and drawing 7, a conductive layer 142 may be formed in the internal surface of a sheet plastic 141, and both sides of a skin, and the conductive layer 142 prepared in the internal surface of a shielding case 140 and the skin through this hole 143 is electrically connected by forming many pinholes 143 in a sheet plastic 141 in this case. Thus, in the shielding case 140 which formed the conductive layer 142 in both sides of a sheet plastic 141, the same shielding effect as the case where a shielding case is formed as a shielding effect of an electromagnetic wave with the metal plate of the same board thickness as the board thickness of a shielding case 140 is expectable.

[0020] The above-mentioned shielding case 140 is inserted in the crevice 121 of the bottom case 120, and by attaching the circuit board 130 in the bottom case 120, as shown in drawing 2 and drawing 3, electronic parts 131 are attached by the circuit board 130 in the state of a wrap. In this case, since the tongue-shaped piece section 145 is formed in the periphery part of a shielding case 140 and this tongue-shaped piece section 145 is formed with the thin sheet plastic, it has sufficient resiliency. Therefore, since this tongue-shaped piece section 145 sticks to the ground pattern 132 of the circuit board 130 in the condition with resiliency, the conductive layer 142 and the ground pattern 132 of a shielding case 140 are connected certainly electrically. Moreover, since the wall surface 147 of the crevice 146 where the rib 122 of the bottom case 120 of the shielding cases 140 is inserted also contacts the ground pattern 132, a shielding case 140 is electrically connected to the ground pattern 132 for every each part store. On the other hand, the ground pattern 133 is formed also in the rear-face side of the circuit board 130. Therefore, electronic parts 131 will be in the condition of having been covered by the conductive layer 142 of a shielding case 140, and the ground pattern 133 of the circuit board 130, and can carry out internal and external electromagnetic shielding to a shielding case 140 for every each part store of formation.

[0021] Drawing 9 and drawing 10 are drawings showing the 2nd example, and it is drawing showing change when drawing 9 contacts the perspective view of a shielding case and drawing 10 contacts the tongue-shaped piece section of a shielding case to the circuit board.

[0022] In shielding case 140A of this example, it has the same composition as a shielding case 140 except for the point that consider as the configuration where the configuration of tongue-shaped piece section 145A curved, and the notch 146 is formed at intervals of predetermined. In this example, if tongue-shaped piece section 145A is forced on the ground pattern 132 of the circuit board 130, since tongue-shaped piece section 145A will deform into the crushed condition that it is shown in drawing 10 (b) from the condition shown in drawing 10 (a) and it will stick to the ground pattern 132, the electrical installation of tongue-shaped piece section 145A and the ground pattern 132 is certainly securable in many parts. In addition, since tongue-shaped piece section 145A has resiliency, if pressurization is canceled, it will return to the original condition.

[0023] Drawing 11 and drawing 12 are drawings showing the 3rd example, and it is drawing showing change when drawing 11 contacts the perspective view of a shielding case and drawing 12 contacts the tongue-shaped piece section of a shielding case to the circuit board.

[0024] In shielding case 140B of this example, the spherical projected part 147 is tongue-shaped piece section 145B with the same configuration as a shielding case 140 except for the point currently formed at intervals of predetermined. In this example, if the projected part 147 of tongue-shaped piece section 145B is forced on the ground pattern 132 of the circuit board 130, since a projected part 147 will change to the crushed configuration as shown in drawing 12 (b) from the condition shown in drawing 12 (a) and will be stuck to the ground pattern 132, the electrical installation of tongue-shaped piece section 145B and the ground pattern 132 is certainly securable in many parts. In addition, since the projected part 147 of tongue-shaped piece section 145B has resiliency, if pressurization is canceled, it will return to the original condition.

[0025] Drawing 13 and drawing 14 are drawings showing the 4th example, and it is a sectional

view in the condition of drawing 13 having attached the shielding case in the perspective view of a shielding case, and having attached drawing 14 in the circuit board. Although the point currently fabricated in the shape of a case with the sheet plastic 141 with thin shielding case 140C of this example is common in a shielding case 140, it differs by masking in the case of electric conduction processing in that the conductive layer 148 for Batang insulated with the conductive layer 142 for shielding and this conductive layer 142 is formed. In this example, while becoming possible about the electronic parts 131 of the circuit board 130 to connect with the pattern section 136 for connection of the hot line 135 of the circuit board 130 in a wrap and the conductive layer 148 for patterns by shielding case 140C and being able to shield electronic parts by this shielding case 140C, it can serve as the role of lead wire or a jumper.

[0026]

[Effect of the Invention] Since the shielding case is constituted from fabricating a sheet plastic so that the location contacted to the ground pattern of the circuit board may be equipped with the tongue-shaped piece section and the tongue-shaped piece section of a shielding case is fabricated from a sheet plastic when a shielding case is inserted into the internal surface and the circuit board of a case in the 1st invention concerning claims 1 and 2 as explained above, the electric contact with a deflection good [the tongue-shaped piece section] is acquired by the press from a case. Thereby, the electric contact between ground patterns has the advantage of it becoming unnecessary to prepare member with an another shielding case. Moreover, it adds to the configuration described above in the 2nd invention concerning claims 3 and 4. The 2nd engagement section which engages with the 1st engagement section of a case further is prepared in a shielding case by shaping of a sheet plastic. Since the 2nd engagement section is pressed by the circuit board and said conductive layer is contacted to a ground pattern when a shielding case is inserted between a case and the circuit board, it becomes possible to also prevent the electric-wave interference between each circuit block divided with the 2nd engagement section.

[0027] By the electronic equipment in invention of **** 3 concerning claims 5 and 6 Since the conductive layer for patterns insulated with this conductive layer other than the conductive layer for shielding by performing electric conduction processing to the fabricated sheet plastic is formed, a shielding case the effectiveness that the conductive layer for circuit patterns of a shielding case can be substituted for the circuit pattern which needs to be prepared in the circuit board, and lead wire and a jumper in addition to the effectiveness by the 1st invention -- it is -- the components mark of electronic equipment -- being reducible .

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DESCRIPTION OF DRAWINGS

[Brief Description of the Drawings]

[Drawing 1] The decomposition perspective view showing the outline configuration of the cellular phone concerning the 1st example of this invention.

[Drawing 2] The sectional view of the cellular phone concerning drawing 1 .

- [Drawing 3] The round part A enlarged drawing of drawing 2 .
- [Drawing 4] The perspective view of the shielding case (one side electric conduction processing) used for the cellular phone concerning drawing 1 .
- [Drawing 5] The fragmentary sectional view of the shielding case of drawing 4 .
- [Drawing 6] The perspective view of the shielding case (double-sided electric conduction processing) used for the cellular phone concerning drawing 1 .
- [Drawing 7] The fragmentary sectional view of the shielding case of drawing 6 .
- [Drawing 8] Drawing which compared the property of the various sheets plastic which can be used for shaping of a shielding case.
- [Drawing 9] The perspective view of the shielding case concerning the 2nd example of this invention.
- [Drawing 10] Drawing showing the operation at the time of making the tongue-shaped piece section of the shielding case of drawing 9 contact the circuit board.
- [Drawing 11] The perspective view of the shielding case concerning the 3rd example of this invention.
- [Drawing 12] Drawing showing the operation at the time of making the tongue-shaped piece section of the shielding case of drawing 11 contact the circuit board.
- [Drawing 13] The perspective view of the shielding case concerning the 4th example of this invention.
- [Drawing 14] The sectional view in the condition of having attached the shielding case of drawing 13 in the circuit board.
- [Drawing 15] The decomposition perspective view showing the configuration of the conventional cellular phone.
- [Drawing 16] The sectional view of the cellular phone concerning drawing 15 .
- [Drawing 17] The round part B enlarged drawing of drawing 16 .
- [Drawing 18] The sectional view showing the example which prepared the piece of a metal to the rib of the bottom case of the cellular phone concerning drawing 15 .
- [Drawing 19] The sectional view showing the configuration of another conventional cellular phone.
- [Drawing 20] The round part C enlarged drawing of drawing 19 .
- [Description of Notations]
- 120 Plastics Case (Bottom Case) 121 Crevice
- 130 Circuit Board 131 Electronic Parts
- 140,140A, 140B, 140C Shielding case
- 141 Sheet Plastic 142 Conductive Layer for Shielding
- 148 Conductive Layer for Patterns

[Translation done.]

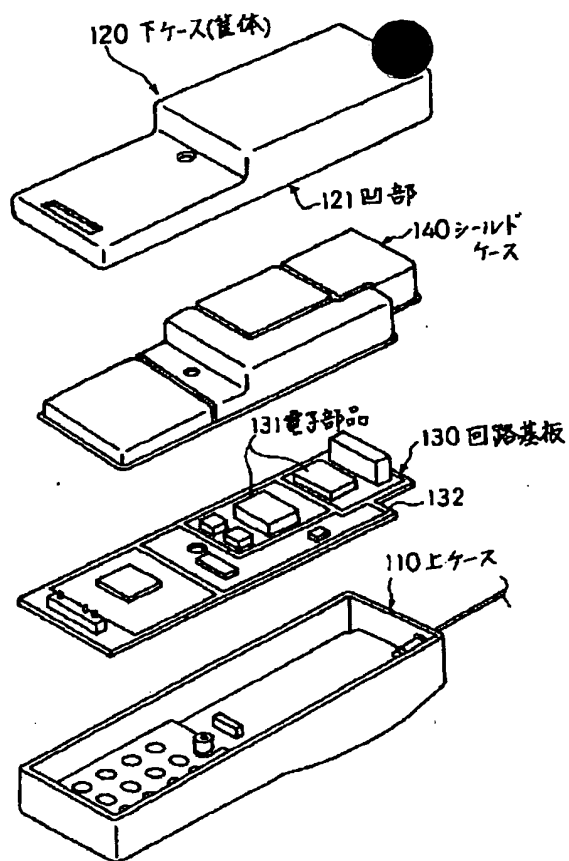
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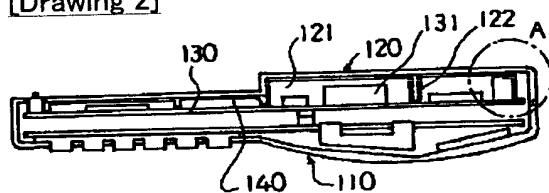
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DRAWINGS

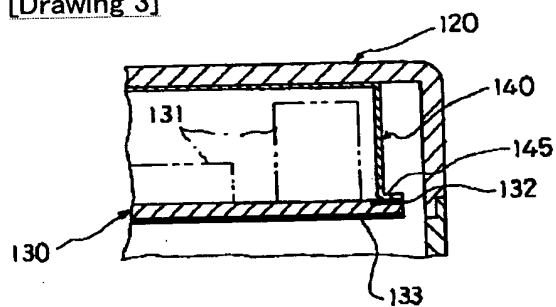
[Drawing 1]



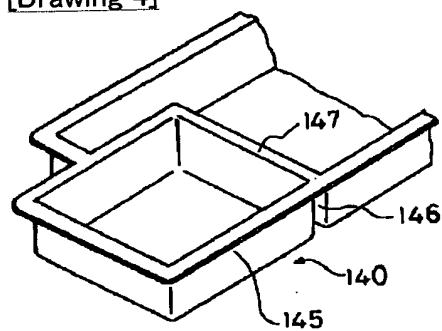
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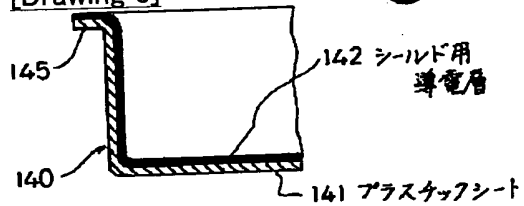
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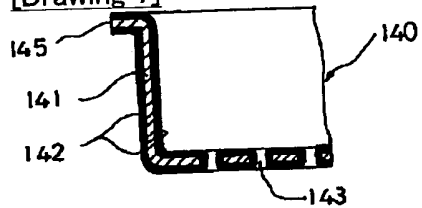
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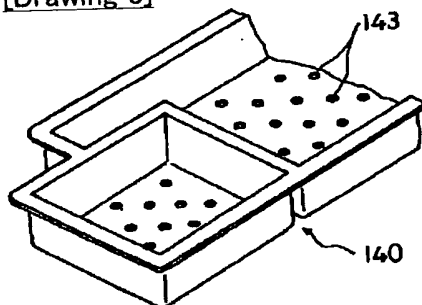
[Drawing 5]



[Drawing 7]



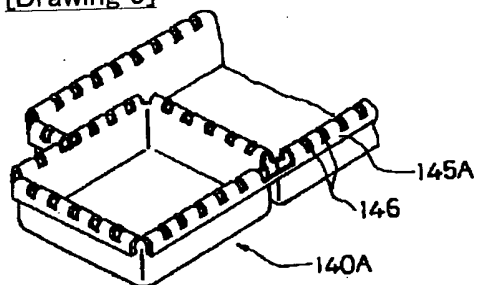
[Drawing 6]



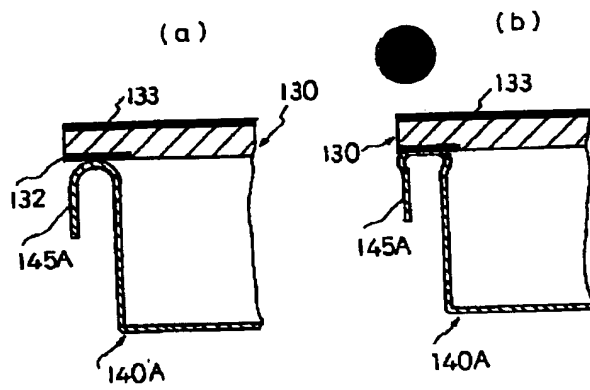
[Drawing 8]

材質	耐熱性	メッキ性	軽年変化
PET	やや低い	良好	少い
PC	高い	良好	少い
PVC	低い	良好	多少ある
ABS	中程度	良好	少い

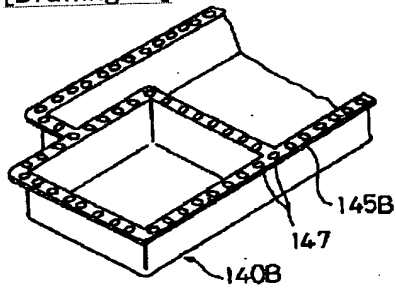
[Drawing 9]



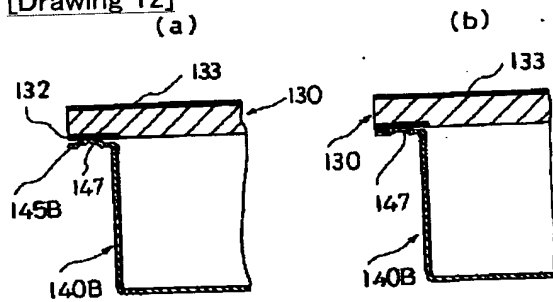
[Drawing 10]



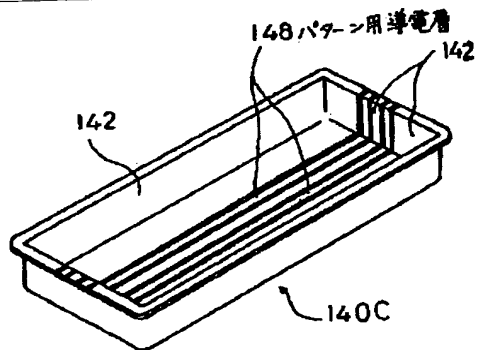
[Drawing 11]



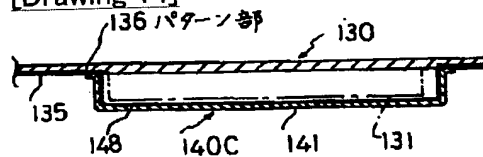
[Drawing 12]



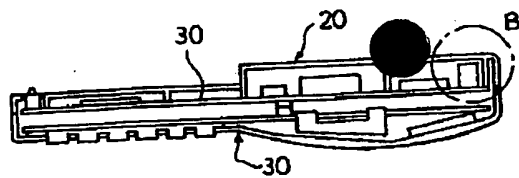
[Drawing 13]



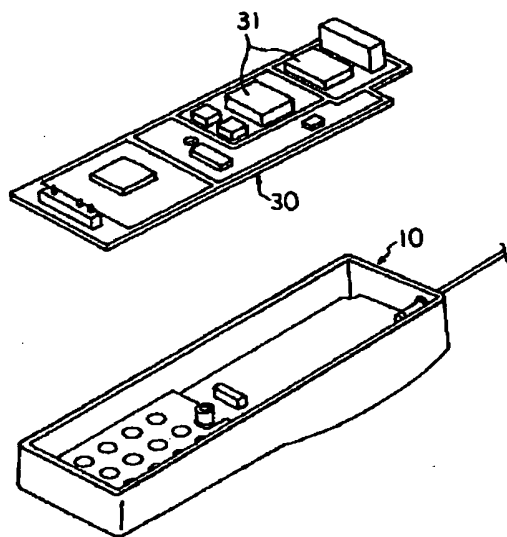
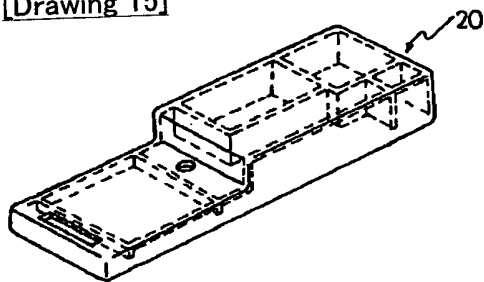
[Drawing 14]



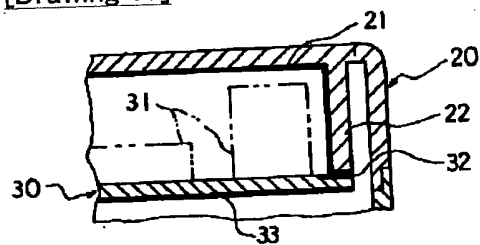
[Drawing 16]



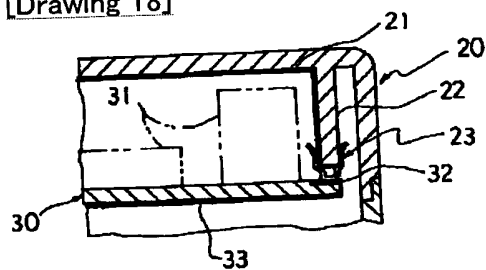
[Drawing 15]



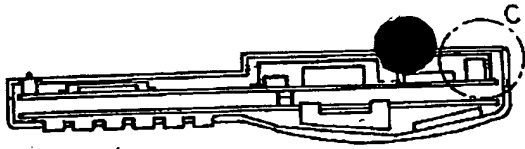
[Drawing 17]



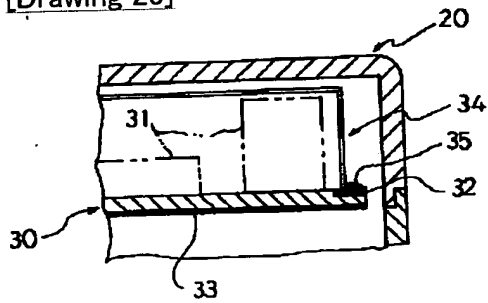
[Drawing 18]



[Drawing 19]



[Drawing 20]



[Translation done.]

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